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ABSTRACT

The influence of immediate working environment upon research productivity of 1,009 academic, physical scientists was examined. Working environment was classified as being either professionally oriented and supportive of scientific productivity, or organizationally oriented and supportive of bureaucratic advancement. Liberal arts, parochial, and service orientations were classified as organizational, while research context was classified as professional. These environments were examined in relationship to personal teaching philosophy, parameters of an ideal position, mean annual publication rate, and grant-getting. Individuals in the research environment sought new positions for organizational reasons, while individuals in nonresearch environments sought new positions for professional reasons. Professionally-oriented parameters were the primary determinants of productivity. It was found that while scientists might overtly subscribe to the goals of an institution, they were aware that they need to be in an environment that is supportive of research in order to be productive. It would appear that for the physical scientist, the liberal arts and parochial environments are particularly inhibiting of productivity. (Author/SW)

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REWARD SYSTEMS: THE ACADEMIC ENVIRONMENT AND SCIENTIFIC PRODUCTIVITY

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REWARD SYSTEMS: THE ACADEMIC ENVIRONMENT AND SCIENTIFIC PRODUCTIVITY

ABSTRACT

This paper examines the influence of immediate working environment upon research productivity of 1009 academic, physical scientists. Working environment was classified as being either professionally oriented and supportive of scientific productivity, or organizationally oriented and supportive of bureaucratic advancement. Four environments were identified. Liberal Arts, Parochial, and Service orientations were classified as organizational; Research context as professional. These environments were examined in relationship to personal teaching philosophy, parameters of an ideal position, mean annual publication rate and grant getting. Regression of teaching goals upon the environments demonstrated strong congruence particularly in the Research and Parochial contexts. However, regression of the ideal environment upon present environment indicated considerable divergence between current environment and the desired appointment. Individuals in the research environment sought new positions for organizational reasons; individuals in non-research environments sought new positions for professional reasons. Professionally oriented parameters were the primary determinants of productivity. It is found that while scientists might overtly subscribe to the goals of an institution they are aware that they need to be in an environment that is supportive of research in order to be productive. It would appear that for the physical scientist the Liberal Arts and Parochial environments are particularly inhibiting of productivity.

Inquiry examining differing productivity rates among academic scientists falls into two categories. One line of research examines individual determinants of productivity; personal characteristics like the Coles' consideration of stamina (1973:71) and the "sacred spark" (1973:114); considerations of training and background (Wanner, Lewis and Gregorio, 1981); socialization of the individual into the productive "invisible colleges" (Reskin, 1977); informal and formal reinforcement of the social norms of the profession (Hagstrom, 1965; Zuckerman, 1970); and even examination of the psychological traits of the productive neurotic (Kubie, 1954). The second major area of investigation considers organizational or contextual influences. The relationship between setting and productivity has been acknowledged, the literature considers diverse aspects of the issue, the effects of organizational style and motivation upon productivity (Pelz and Andrews, 1966), or organizational behaviors that influence productivity (Fulton and Trow, 1974), or context and creativity (Taylor and Barron, 1963). More typically consideration of environment and productivity in academia has been concentrated upon the tangible measures of academic context that are reported to positively influence productivity such as institutional wealth, enrollment selectivity, library facilities, research facilities, faculty quality, regional location, and type of institution.

Leibert in his consideration of "major league" and "minor league" institutions cites these influences as being a significant cause of universities with graduate schools greater grant getting ability. Crane asserts that even when considering universities of similar type, a scientist gains more professionally from employment by a major university with superior facilities than from personal determinants such as influence of mentors, pre-doctoral publication and graduation from a prestigious department (1965). Other measures of environment utilize the standard rankings of colleges and universities, Cartter, or Roose and Anderson, to develop prestige measures for institutions and departments studied. The work of Long examining the prestige of bio-scientists (1978) and Reskin's work, linking productivity with prestige of the department of first employment (1977) are typical uses of rankings to measure institutional environment. These prestige scores are based on the more tangible measures listed earlier. Roose and Anderson developed their scale from evaluation of graduate faculty and quality, regional location, and effectiveness of the doctoral program (1970). Cartter examined college type, percentage distribution of degrees, region, library holdings, means of funding, amount

of endowment etc. (1966). In addition to ignoring elements not influenced by the financial status of the institution these measures assume that all scientists who are potentially productive hold appointments at universities with graduate schools. The validity of such an assertion has been eroding since the early seventies when increasing numbers of scientists sought employment in institutions traditionally not considered by graduates of research oriented institutions. (Bayer, 1974; Darknell, 1981)

Despite frequent consideration of the effect of environment upon productivity and Cartter's acknowledgement of the trend for scientists with research oriented training to take positions at non-research institutions as early as 1965; there has been little serious ranking of the non-research oriented institutions or consideration of the effect of philosophical rather than the financial differences considered in Cartter, Roose and Anderson and Carnegie rankings. This is surprising in light of the considerable work exploring student understanding or perception of college environment (Astin, 1968; Pace, 1963, 1969), and the psychological and sociological mechanisms that determine performance of undergraduates (Thistlethwaite and Wheeler, 1966; Davis; 1966; Bassis, 1977). Thus, the work of Gross and Grambsch is unique since they directly and specifically sought to quantify the differences between the perceived goals of administrators at an institution and the goals of the faculty. They further sought to quantify the differences between these perceptions and the stated goals of the institution (1968). But this study was concerned with the effect of goal congruence and conflict upon teaching not research productivity. Ironically, surveys of faculty, including those used as basis of many studies of productivity, have since the Pelz and Andrews study (1966) included questions apparently included to explore respondents' perception of environment.

Despite assertions that scientists are more loyal to and motivated by the primarily honorific systems of their disciplines and more influenced by the norms of the invisible colleges than the norms of the employing institutions (Merton, 1957:641) there is considerable evidence that the immediate context is important. If it were not, the "sacred spark" theory (Cole and Cole, 1973) would not have remained untested for so long. Furthermore, the occurrence of well-trained scientists who do nothing after graduation to gain the rewards of the system would be the rarity rather than the norm (Price, 1963:47). Access to immediate rewards— research facilities, lighter teaching

loads, support and recognition for publication—from the employing context seem to support productivity and be the wellspring of the cosmopolitan norms that Merton contends motivate productive scientists (1958). Likewise lack of these rewards and the resultant absence of articulation with the cosmopolitan norms at non-research oriented institutions seems to inhibit productivity (Reskin, 1977:501).

The rewards of the discipline's system particularly for the individual at a locally focused, non-research oriented institution can be debilitatingly long in coming (Goode, 1960:254). Publication lag can defer publication of results for up to two years after securing acceptance of an article which can be a protracted procedure in itself. Grant proposals are expensive and take months to prepare and require cooperation of the employing institution to complete successfully. The wait for a decision by the granting agency can be lengthy, and the rejection rate is high even for experienced, successful grant getters. Without local, contextual support—citing unpublished results, support of the grant seeking process, time for research, and at least tacit departmental approval of productive activities—the most robust "sacred spark" can be extinguished while waiting for the system's recognition. Hagstrom observed that organizations respecting the production of knowledge must reinforce the behavior with professional rewards to permit the future expansion of knowledge (1965:39). On the other hand, institutions committed to locally prescribed goals will use organizational rewards rather than professional incentives (Hagstrom, 1965:37; Kornhauser, 1962:31). Environmental support of the professional reward system that values research productivity is manifest in desirable teaching assignments, research facilities, and research time (Hagstrom, 1968); recognition by one's peers via citation and opportunities to participate in colloquia (Price, 1963). Organizational incentives are counter to the reward system of science and are typified by raises, promotions, administrative assignments and other financial considerations (Goode, 1960). This suggests that it is not merely the financial base of an institution that determines productivity but how financial support is applied by the institution or sought by the appointee. A manifestation of this is the well-trained scientist from a relatively prestigious graduate department employed by an equally prestigious department who, lacking an acceptable record of productivity that would allow movement to a similar position in a more prestigious department accepts tenure, higher rank, higher pay or a

department chair at a lesser institution (Caplow and McGee, 1958:75-76, 147). It would appear that professional rewards of this stratification can operate both in the manner of the environmental press (Thistlethwaite and Wheeler, 1966) and the theory of relative deprivation (Davis, 1966). As the result of the environmental press—being a little fish in a large pond—a young scientist at a prestigious research institution may be socialized into the profession and strive to attain the norms via professional rewards of the discipline. Conversely, a scientist at either a research oriented institution or a non-research oriented institution can be influenced by the dynamics of the reference group; aspirations and self-evaluations not determined merely by their objective position but by their standing relative to specific persons with whom they compare (Davis, 1966). Thus, if the rewards of one's reference group are professional rewards in a research oriented environment one is likely to become a productive researcher. If the rewards of the reference group are organizational one is likely to subscribe to those norms and forsake research. The latter condition seems to be a more frequent occurrence particularly since employment opportunities in research oriented institutions have been decreasing and more graduates of prestigious departments have taken employment at institutions that do not subscribe in the immediate context to supporting the discipline wide professional goals (Moffat, 1978; Muffo and Robinson, 1981). This is the process Darknell refers to as the "rustification" of science (1981).

In an effort to determine if immediate environments are readily discernible to individuals working in them, and if the environments affected productivity, this study sought to examine the environmental determinants of productivity by:

1. Isolating institutional environments reported via perceived institutional goals;
2. Examining the relationship between respondents' current working environments as manifest in the relationship between teaching goals and institutional environment;
3. Examining the relationship between respondents' ideal environment as reported via parameters deemed important or unimportant in a new appointment and the institutional environment;
4. Examining all these elements as determinants of productivity.

Institutional, teaching, and ideal environments were designated as

subscribing to either the professional reward system of science if they represented primarily honorific advancement and provided more time or better conditions for research, or promoted sound research practices in students. Organizationally oriented goals were those that represented financial or bureaucratic advancement, local associations, teaching or preparation for an occupation (Caplow and McGee, 1968). An underlying assumption throughout the study was that professional norms were conducive to productivity while organizational norms were not.

DATA

The study utilized the 1973 American Council on Education Survey of Teaching Faculty, deriving a sample of 1009 Physical Scientists holding Ph.D.s and full-time teaching appointments from a random one-third sample of the total data set. Two subsets, respondents holding a Ph.D. for ten years or less, and those holding the Ph.D. for eleven years or more were studied to determine if younger academicians were more professionally oriented than older academicians or if older scientists were more organizationally inclined than the younger cohort. There was no limitation placed on employing institution since the purpose of the study was to detect the variety of destination environments scientists were employed in. The data set was used since it is one of the best available; it is large, and has been used in previous studies (Wanner, Lewis and Gregorio; and Leibert) to examine productivity.

ANALYTICAL FRAMEWORK AND STATISTICAL METHODS

1. Development of perceived contextual measures. At least four contexts were discernible in the sixteen variables recording responses regarding perceived institutional goals to the question: "How important is each of the following as your institution's goal in undergraduate teaching?". The respondents had the option of ranking each of the ensuing elements, essential, very important, somewhat important, and not important or irrelevant. One environment was designated as adhering to professional norms—Research Context; the others, Liberal Arts/General Education, Parochial, and Service Contexts were designated as adhering to organizational norms. The sixteen variables were expected to cluster or show interrelations as follows.

A. Liberal Arts/General Education Orientation

Convey Appreciation of the Liberal Arts
Develop Creative Capacities
Prepare for More Education
Increase Desire for Self-Directed Learning
Provide for Students' Emotional Development
Achieve Deeper Levels of Student Self-Understanding
Provide Tools for the Evaluation of Contemporary Society

B. Research Orientation
Develop Mastery of Discipline
Increase Desire for Self-Directed Learning
Develop Ability to Think Clearly
Develop Creative Capacities
Develop the Ability to Pursue Research
Prepare for More Education

C. Parochial Orientation
Develop Moral Character
Develop Religious Beliefs and Convictions
Provide for Students' Emotional Development
Develop Responsible Citizens
Prepare for Family Living

D. Service Orientation
Prepare for Employment
Develop Responsible Citizens
Provide Local Community with Skilled Human Resources

Principle Component Factor Analysis utilizing orthogonal rotations to a terminal solution was employed to determine if any viable relationships existed.

2. Creation of new variables representing institutional goal relationships were extracted by factor analysis using the factor score coefficients.

3. Examination of the relationship of working and ideal environment to institutional environment (factor derived variables) via step-wise multiple regression.

A. Respondents' perceptions of the parameters of their current appointments were explored via their response to the question: "How important is each of the following as your personal goal or aim in teaching undergraduates?". Since previous research repeatedly fails to demonstrate convincing relationships between reported number of hours spent each week in teaching, research, administrative duties, etc., and productivity, (Gaston, 1970; Fulton and Trow, 1974:62; Simon, 1974; Hargens, 1977), charting faculty members' perception of their working millieu via teaching goals was chosen over describing it in terms of numbers of courses, numbers in classes, and time reported spent in various academic activities. The wording of the variables representing personal teaching goals paralleled exactly the environmental perceptions and were classified in exactly the same manner, the Research Context reflecting a professional orientation, Liberal Arts/General, Service, and Parochial organizational orientations.

B. Professional and organizational parameters of the ideal appointment were selected from responses to the question: "If you were to seek another position elsewhere, what importance would you attach to the following?" The qualities deemed representative of the professional reward system were—more time for research, smaller teaching load, less administrative responsibility, better research facilities. The qualities representative of the organizational reward system were—higher salary, higher rank, tenure, less pressure to publish, more opportunities to teach, more administrative duties, better students. This classification is based heavily upon the work of Caplow and McGee, who assert that professionally or cosmopolitanly oriented academics often seek lesser or comparable positions to their current appointment at more prestigious research institutions; while more organizationally oriented academics select environments that provide material benefits, security or bureaucratic prestige at less prestigious institutions (1968:75-76). Hargens contends that this highly structured movement within the hierarchy is not as rigid as Caplow and McGee suggest. In his 1961 study he cites that sixteen percent of new Ph.D.'s were inbred; of those not inbred, fifty percent found employment at institutions with comparable prestige level of the graduating institution. Of those who were hired at less prestigious institutions, fifty nine percent graduated in the geographical region of first appointment. However, this study only considers first appointments and prestige of educational background; it does not consider the effect of the working and aspired to

environment; furthermore, Hargens only considers scientists early in their careers; before there has been any adjustment in environment, or sufficient elapsed time for productivity differentials to develop.

Two additional qualities of the new position were included, Chance for Advancement and Better Colleagues. No expected direction of the relationship was stated since the understanding of these concepts could be influenced by the motivation and perception of the respondent. Advancement, while it most probably represents an organizational parameter (Caplow and McGee, 1968:85) could be interpreted by the professionally motivated as professional advancement. Even more subject to ambiguous interpretation by respondents, Better Colleagues, can, according to Caplow and McGee, mean a sense of collegiality and local association to the organizationally motivated while being interpreted by the professionally motivated as better, more influential scientists, more members of invisible colleges (Caplow and McGee, 1968:71; Price, 1963).

The relationship between present orientation, ideal appointment, and the environment was examined by stepwise multiple regression utilizing the environmentally oriented variables as dependent variables, and the variables describing current goals and desired position as independent variables. The parameters of a new position were entered first since they were most likely to identify the outlying conditions over the expected combinations of individual orientation and environment, e.g., professionally oriented individuals in organizationally oriented environments and vice versa. These individuals are of primary interest when considering productivity.

4. Examination of the influence of institutional, teaching and ideal environment upon productivity. The dependent variables were annual publication rate, computed from total journal articles divided by years since completion of Ph.D.; and, funded research. Stepwise multiple regression was used to discern the determinants of productivity. The factor based variables were entered on the first step not solely because this study is primarily a consideration of the influence of the environment upon productivity but because of the loss of detail that frequently results from the generalizing effect experienced when new variables are created from factor scores. This condition is heightened when the factors are further simplified by rotation. Parameters of the ideal position were entered on the second step in an effort to discern the effects of outliers, teaching goals on the third.

EXPECTED OUTCOMES

1. The determinants of productivity would be professionally oriented variables.

2. If research oriented scientists are as asserted in the literature taking appointments in non-research environments, the parameters of an ideal environment would be professionally oriented, demonstrating respondents' expectations for positions supportive of research.

3. If non-research oriented, or non-competitive researchers are employed in research oriented environments the parameters of the ideal environment would be organizationally based demonstrating that such individuals seek employment outside the reward structure of science.

4. The determinants of a productive environment would be similar to the determinants of productivity.

5. Older respondents would be more organizationally motivated than younger respondents.

6. The relationships would be expected to demonstrate low but significant betas as a result of using variables derived from factor analysis, which while demonstrating relationships between groups of variables obliterates detail.

RESULTS AND FINDINGS

1. Four factors were extracted using varimax rotation almost exactly as predicted. These factors emerged with eigen values greater than 1.0 and accounted for 59.6% of the explained variance.

TABLE I

Factor	Eigen Value	% of Variance
1	4.53727	28.4
2	2.38341	14.9
3	1.52930	9.6
4	1.09360	6.8

Examination of the unrotated factor matrix demonstrated as indicated by the eigen values and explained variance a heavy loading on factor 1 of variables representing all the posited environments. However, key variables demonstrated highest loadings on other factors: Factor 2, Develop Mastery of Discipline .44689; Develop Ability to Pursue Research, .61961; and Prepare for More Education, .48764; Factor 3, Prepare for Employment, .77456, Provide the Local Community with Skilled Human Resources, .60302; Factor 4, Develop Religious Beliefs and Convictions, .61372. Since without rotation there was already heavy loading of a majority of variables on the first factor indicating one general factor and three sub-clusters of variables (a condition sought with quartimax rotation which seeks to simplify the relationship between the rows of the factor matrix where a variable loads high on one factor and almost zero on others) varimax rotation was determined to be the most appropriate solution since it seeks to simplify the columns of the factor matrix, i.e., loadings in the columns are as close to zero or one as possible. Thus, discernment of the variance between a series of sub-clusters is possible.

The expected and observed results of varimax rotation are summarized in Table II. The only outcome not anticipated was the low loading for the variable, Prepare for More Education, on the factor where most of the variables posited to fall in the Liberal Arts/General Education category clustered, -.16691. Since all respondents were scientists this might simply be the result of respondents reporting that the institutions that employed them were not preparing undergraduates for more education in the sciences and their not considering students' preparation for graduate work in the humanities, business, education and professional schools rather than suggesting that Liberal Arts oriented characteristics in the environment precluded preparation for further education. While not expected, the almost equal loading of Develop Responsible Citizens on Factor 1, Liberal Arts/General Education .44974; Factor 3, Parochial .41830; and the predicted Factor 4, Service .43254, was acceptable since it is a quality to which most institutions of higher education subscribe.

Since the four factors posited emerged, new variables were created from the factor score coefficients for each variable on each factor of the rotated solution. When combined with individual standardized scores the four new

variables that resulted represented the relationship between the perceived institutional goal clusters.

2. There was considerable congruence between teaching goals and perceived institutional goal groupings. Regression of teaching goals and parameters of a new appointment with the Liberal Arts/General Education context as the dependent variable resulted in four of the independent variables that paralleled the institutional goals clustered in this variable entering as significant. (Significance throughout this study was set at an F to enter greater than 4.0 and a tolerance greater than .15.) Convey Appreciation of the Liberal Arts, beta=.11488, F to enter=13.522; Provide for Students' Emotional Development, beta=.10143, F=4.965; Develop Responsible Citizens, beta=.09942, F=29.670; Develop Creative Capacities, beta=.06774, F=15.690. Two variables that clustered on the Parochial Factor, Develop Religious Beliefs and Convictions and Develop Moral Character demonstrated low but significant negative relationships, beta=-.11973, F=10.207 and beta=-.08471, F=4.378, respectively. The only unexpected determinant entering as significant was Provide the Local Community with Skilled Human Resources, beta=.09353, F=9.147. Apparently scientists in this sample employed in institutions where the environmental goals that cluster in the dependent variable Liberal Arts/General Education, subscribe to teaching goals congruent with their environment rather than research oriented goals.

Scientists reporting as important the perceived institutional goals that weighted heavily on the Research oriented cluster demonstrated higher congruence between personal and institutional goals than the Liberal Arts/General Education environment. Five of the six teaching goals that paralleled the institutional characteristics clustered on this factor entered as significant. Unlike these responses of those perceiving a liberal arts context as most important two of these variables demonstrated stronger betas than the parameters of the ideal position. The key variable, Prepare Undergraduates to Pursue Research, was the primary determinant, Beta=.18006, F=26.731 on the final step; however, beta to enter=.31951, F=112.071 indicating that the subsequently entering research oriented teaching goals were sufficiently colinear to erode the strength of the correlation. A condition supportive of the clusters of environmental variables extracted by factor analysis and grouping the teaching variables in similar categories as described above. The

second strongest determinant was Develop Creative Capacities, beta=.16896. Other teaching goals entering as positive and significant were Develop Mastery of Discipline, Develop Ability to Think Clearly and Prepare for More Education. (See Table III)

The Primary determinants of the Parochial context were the three teaching goals that mirrored the three environmental variables that weighted most heavily on the factor from which the variable was derived, entered as significant; Develop Moral Character, beta=.22053; Provide for Students' Emotional Development, beta=.20223; Instill Religious Beliefs and Convictions, beta=.20029. Very low but statistically significant negative relationships existed between this variable and Develop Appreciation of the Liberal Arts and Develop Creative Capacities. (See Table III)

The service oriented context demonstrated an almost similar condition: two of the three variables demonstrating the highest betas reflecting the same qualities as the environmental variables that clustered on the factor based variable. Provide the Local Community with Skilled Human Resources demonstrated the highest beta in the study, beta to enter .36840, F to enter 161.054; beta in the final step .28326. The second strongest determinant was Prepare for Employment, beta=.17891. The third most significant determinant was provide Tools for the Evaluation of Contemporary Society; this was posited as being a significant element in the environmental cluster in the analytical framework but did not weight heavily on the fourth factor extracted as expected. It would appear that this element can be present in this context via the teaching goals of faculty even if it is not discernible in the perceived environment. (See Table III for complete summary of results)

Despite the assertions of Bayer (1974) and Darknell (1981) that increasing numbers of research trained Ph.D.s are taking appointments at institutions not noted for their research contribution it appears from the congruence between teaching goals and perceived environmental goals in the non-research oriented environments that there is less conflict than one might expect between scientists who could be professionally oriented and organizationally oriented institutions; or there are too few individuals with disparate goals in these environments to emerge as significant. Examination of the two subsets differentiating on the basis of career age did little to alter these findings. Examination of the more recent Ph.D.s did not demonstrate a different outcome. Fewer teaching variables entered as significant when

regressed against Liberal Arts/General Education; Convey Basic Appreciation of the Liberal Arts was the weakest of the variables entering as significant, Developing Responsible Citizens was the strongest followed by Developing the Ability to Think Clearly. While this variable loaded most heavily on the research oriented factor .63744 it should be noted that it also weighted strongly on the Liberal Arts factor .51340 and cannot be cited as a departure from congruence with institutional goals. (See Table IV)

The older subset demonstrated as significant and positive, Develop Creative Capacities, Develop Appreciation for the Liberal Arts, Provide Tools for Evaluation of Contemporary Society, yet the primary determinant was a negative relationship with Instill Religious Beliefs and Convictions. Also entering as significant was a non-research oriented teaching goal not weighted heavily on the factor cluster—Provide the Local Community with Skilled Human Resources. (See Table V) While the congruence is not as strong as for the full sample there is insufficient evidence to suggest any conflict between teaching goals and environmental goals. Even less differentiation of the basis of career age was observed in the Parochial and Service Environments. The more recent Ph.D.s who observed the Parochial Environment cited as important personal teaching goals, Provide for Students' Emotional Development, Instill Religious Beliefs and Convictions, followed by Develop Moral Character and Develop Responsible Citizens. The older subset cited Development of Moral Character, Instilling Religious Beliefs and Convictions and Providing for Students' Emotional Development as the three principle determinants of their environment. A fourth variable entered negatively, Provide Tools for the Evaluation of Contemporary Society. (Table V)

More recent Ph.D.s observing a service environment demonstrated the key variable, Provide the Local Community with Skilled Human Resources as the Primary Determinant of their Environment. This was followed by Provide the Local Community with Skilled Human Resources as the Primary Determinant of their Environment. This was followed by Provide Tools for the Evaluation of Contemporary Society, an element that did not weight heavily on this factor weighting most heavily on the Liberal Arts/General Education cluster. The fourth variable to enter as significant was Prepare for More Education. While this is a variable that in the environmental context weighted heavily on the research oriented cluster the evidence is too slender to be considered an indicator of conflict between environmental and teaching goals. (Table V)

The results suggest that either colleges do as asserted by Crane (1965); Hargens, (1961); Hagstrom, (1965); Reskin, (1978) recruit appropriate faculty; there is self selection by prospective and, as Caplow and McGee assert, former faculty (1968:220-222) or, faculty may develop or adapt teaching goals to coincide with the norms of the employing institution. Another contributing element might be the graphic arrangement of these two areas of inquiry in the questionnaire. In a commendable effort to be brief, the subscription to certain teaching goals and the perception of institutional goals were sought not only via identical questions but in the same portion of the questionnaire, the check boxes for teaching goals side-by-side with institutional goals. This could have resulted in greater reported congruence than exists in reality.

3. The divergence between the congruence of teaching goals and the parameters of the ideal position gives credence to the assertion that scientists conform to the teaching norms of a non-research situation; yet they seek new positions for professional reasons despite the apparent adherence to the goals of the institution in the conduct of their undergraduate classes.

A. The Multiple R for the entire sample when regressed upon Liberal Arts Context was .35392 demonstrating an explained variance of 12.5%. Career Age less than or equal to ten years R=.3245, R^2=10.3%; Career Age greater than ten years R=.39013, R^2=15.2%. The low correlation among variables and the small percentage of explained variance is acceptable because of the generalizing effect of the factor based dependent variable. Only three variables describing desired qualities of a new appointment entered as significant. The primary determinant for the equation which included the teaching variables was Better Research Facilities, beta=.16187, F=22.8; these variables also entered as significant in the equations for the subsets Career Age is less than or equal to 10, beta=.18257, Career Age is greater than 10, beta=.14539. Entering next showing a negative relationship was Better Colleagues, beta=-.15274; this variable was the primary determinant in the equation for the subset Career Age is less than or equal to 10, beta=-.19817. The third determinant was Higher Rank, displaying a negative relationship, beta=-.14424. This weighting also existed in both the subsets suggesting that scientists in this environment do not seek organizational advancement in a new position. The older subset also cited as important few administrative duties, beta=.09256, and considered the need for Better Students as

unimportant, beta=-.14710. All these responses suggest a professional orientation. Of particular interest is the consistent negative value of Higher Rank regardless of career age and the consistent positive response to Better Research Facilities. The older scientists eschew the growing administrative load in keeping with professional rather than organizational norms. The negative response to Better Students by the older subset could either be a professionally motivated response indicating that older scientists do not consider students (teaching) a primary concern in a move; or simply an expression of their satisfaction with the calibre of their students even if they are not likely to become scientists.

B. Respondents reporting a Research Oriented Context sought new positions for organizational reasons. The primary determinants of the research environment were as previously reported the closely congruent teaching goals. No clearly research oriented parameters of a new appointment entered as significant in the equation encompassing the entire sample, R=.43413, R^2=.18847. The variable Better Students entered with a low negative beta=-.09889 indicating either satisfaction with the current situation or the professionally oriented disinterest with undergraduate teaching. Smaller Teaching Load entered negatively, beta=-.12577, indicating it was not an essential condition of a new position. Yet, according to the literature a desire for a reduced teaching load is a research oriented characteristic (Caplow and McGee, 1968:85, 220-222). A positive but weak relationship with Tenure emerged beta=.07300, an indication of an organizational orientation. Thus, there is a weak indication that scientists at institutions that subscribe to research oriented goals in their undergraduate teaching and seek new positions do so for organizational reasons. However, the trend is so slight that conclusions should not be drawn without further analysis and replication.

When examining the subset Career Age less than or equal to ten years the primary determinants were again two strongly congruent teaching goals. The importance of tenure in the new position was also evident beta=.07981, as was the unimportance of a lighter teaching load, beta=.10717 and better students, beta=-.13978. However, Less Pressure to Publish entered with a low, positive beta=.09110 an organizational norm indicating dissatisfaction with the emphasis in the current environment upon publication. This group also sought less administrative activity, beta=-.10249; a research and an organizational goal respectively. Conclusions are again tenuous in light of an

R=.36982 and an explained variance of 13.6%; but it would appear that career movement among young scientists in this context is generated by organizational motivations. Examination on a discipline by discipline basis or via subsets or productive and non-productive scientists might clarify this ambivalence. The older scientists, Career Age greater than 10 demonstrated two parameters of an ideal position as significant; Smaller Teaching Load, beta=-.12481, and Higher Rank, beta=.08793. The older cohort appears to be weakly organizationally motivated as asserted by Caplow and McGee (1968). The explained variance for this equation was 24.3%, R=.49301.

C. Running the same regressions with the Parochial Context produced a higher multiple correlation, R=.46412, and explained variance 21%; Career Age less than or equal to ten years R=.51180, explained variance 26%; Career Age greater than ten years R=.48328, explained variance 23%. In each equation the primary determinants were teaching goals which mirrored the environmental goals almost exactly. A low positive beta=.07094 was observed for the variable Smaller Teaching Load; a low negative beta=-.06476 for Tenure, a condition also observed in the subset Career Age less than or equal to ten years, beta=-.13826 and -.05148, respectively. The older subset also demonstrated a positive beta=.07215 for a smaller teaching load and a desire for less administration, beta=.04094. An initial conclusion might be that despite congruence between teaching and environmental goals scientists at institutions subscribing to parochially oriented goals seek new positions for professional reasons. However, since no variables directly representing interest in research entered as significant, and considering that such institutions frequently require heavier teaching and administrative loads, the outcomes might represent the respondents' efforts to escape the realities of their working conditions rather than a desire to relocate in order to pursue research. That it might reflect the honorific reward system of science in light of the relatively strong relationship between the teaching and environmental goals and the weak relationship between the qualities for the ideal position and the current environment is premature.

D. When the Service context was entered as the dependent variable, the independent variables entering as most significant were the individual teaching goals; Providing the Local Community with Skilled Human Resources, demonstrating the highest relationship of the entire study. The parameters of the new position entering as significant were low but more

conclusively organizational. For the entire sample—R=.46512, R^2=.2163; Better Students, beta=.08782; Tenure, beta=.08097; and More Administration, beta=.03362; entered positively pointing to organizational motivations. For respondents Career Age greater than or equal to 10 years, Better Students, beta=.09005 and a desire for Advancement entered positively. It was assumed that the desired advancement was organizationally motivated not professionally oriented since the variable Less Administration entered negatively, beta=-.09133 indicating that less administration was not a requirement of a new appointment. Older respondents sought new positions for Tenure and Better Students. (See Table V)

4. Professionally oriented parameters of the ideal environment were the primary determinants of productivity, suggesting that the more productive individual seeks that environment regardless of current location.

Two measures of productivity were developed; Annual Publication Rate, derived from total self reported journal articles divided by the number of years since completion of the Ph.D., and Grant Getting. The development of a variable measuring funded research was hampered by the small number of individuals, 345 reporting either funding as a principle investigator or in a secondary or supportive capacity. That barely one-third of the respondents had ever been funded is not surprising in light of Price's observation that 25% of scientists produce 75% of the research (1963). Funding was dealt with as a yes/no dichotomy.

Examining the entire sample, regressing the environmental elements on the first step, parameters of the new position on the second step and teaching goals on the third step against annual publication rate demonstrated an R of .31949, an explained variance of 10.2%. The primary determinant of productivity was a negative relationship with Less Pressure to Publish, beta=-.15576, the negative relationship indicating that the low producers considered this quality essential in new position while high producers considered it non-essential—adhering to professional norms. The second strongest determinant was an organizational quality, a positive correlation, beta=.15085 with the variable Higher Rank. However, an examination of the subsets indicates that this result is not that divergent from the expected. Both subsets maintain the professional norm regarding pressure to publish, the highly productive considering it unimportant;—Career Age less or equal to ten years beta=-.13703, Career Age greater than 10 beta=-.22807. Yet

only the more recent Ph.D.s demonstrated Higher Rank as important in a new position, beta=.14065 suggesting that this desire for higher rank is a function of age and a desire to attain a position more likely to acquire other professional rewards rather than a departure from the professional norms. It is also counter to Caplow's and McGee's assertion that organizational rewards are more important to older academics than younger academics; this may not be the case among most productive scientists when considering rank. The alternative explanation of this outcome might be that the older scientists already have relatively high rank and do not consider it as a significant element in a new position. Other variables entering as significant in descending order of strength were; Developing Religious Beliefs and Convictions beta=-.11046, Develop Ability to Pursue Research, beta=.09239, Liberal Arts Context, beta=-.0741, Less Administration, beta=.07296, Better Students, beta=.06045, Better Research Facilities, beta=.05957, and Parochial Context, beta=.05346. With the exception of Better Students, a characteristic subject to ambiguous interpretation, all the characteristics entering as significant are professionally oriented. The negative relationships with the Liberal Arts Context and Develop Religious and Moral Beliefs indicating that productive individuals do not rate the characteristics of the Liberal Arts Context as important at their institutions. Nor do they consider values of the Parochial Context important in their teaching. The entry of the Liberal Arts context demonstrating a stronger beta than some non-composite variables not influenced by the detail reducing effects of factor analysis is important in the consideration of the influence of environment upon productivity.

Examining the subset comprised of more recent Ph.D.s indicated that overall high productivity correlates with the professional elements low productivity with the non-professional norms. The variables entering as significant after a desire for higher rank and the unimportance of Less Pressure to Publish were negative correlations with the Liberal Arts Context, beta=-.11214, Develop Appreciation for the Liberal Arts, beta=-.09752 and Parochial Context beta=-.09345; positive relationships were reported with a need for Less Administration .09222 and Ability to Pursue Research, beta=.09339. These outcomes are particularly significant when considering that respondents reporting a Liberal Arts Context sought new position for primarily professional reasons. These findings also suggest that individuals

in environments where professional elements are not valued are not likely to be productive.

Examination of the older subset produced the highest explained variance for productivity measures in the study 25.8%, R=.50856. In addition to rejecting as a parameter of a new position Less Pressure to Publish, the productive scientists sought better students, beta=.21034, Advancement=.17278 Less Opportunities to Teach beta=-.16159, and rejected the Instilling of Religious Beliefs and Convictions, beta=-.12382 and Development of Responsible Citizens, beta=-.10426 as teaching goals. They cited as important goals as teachers of undergraduates, Development of Creative Capacities, beta=.12020, and Ability to Pursue Research, beta=.10300. As parameters of a new position they sought Less Administration, beta=.10211, a response that justifies the assertion that the positive response to advancement in this equation is professionally motivated. The Research Oriented Context demonstrated a weak positive relationship, indicating that older, productive scientists were in environments where they perceived research oriented goals to be important. The parochial environment entered as significant, F greater than 4.0, showing a very weak negative relationship, beta=-.01804.

Examination of the determinants of funded research was not conclusive. It is possible that the outcomes were influenced by the development of this variable from a broad spectrum of sources through the combination of 40 variables each with very low frequencies and the small number of grant recipients in the sample. In most respects the variables entering as significant demonstrate that elements subscribing to the professional reward system are more conducive to high productivity than elements on the working environment subscribing to organizational norms. In the total sample the teaching goal, Pursue Research was the primary determinant, beta=-.12410 (the negative value is a function of scale). Other professionally oriented variables entering as significant were unimportance or inapplicably of Prepare for Family Living as a teaching goal; Less Pressure to Publish was rated as not an essential element in a new position the necessity of a Smaller Teaching load and Better Research Facilities (See Table VI). However, they did not consider preparing undergraduates for More Education as important, nor did they consider a Smaller Teaching Load essential in a new position. They did cite Higher Rank as a parameter of a new position. While the immediate assumption could be that grant getters are more organizationally oriented, but

considering the weakness of the significant betas (see Table VI) this assumption should be tempered with the recognition that these individuals might not have large number of undergraduate students and already have a small teaching load because the funding they obtain allows them release from those duties. This is slimly supported by the recurrence of the relationship between higher rank and the productivity measures in the two subsets. When publication rate was the dependent variable the younger grant recipients sought higher rank in a new position while the older subset did not. Suggesting again the decline in interest in rank is concomitant with one attaining that rank; not a desire for the security of organizational rewards with advancing career age. However, assumptions drawn from this series of regressions were tenuous because of the very low multiple R's and explained variance. R for the full sample =.23080, R^2=.05327; the younger subset, R=.26124, R^2=.06824; the older subset, R=.21845, R^2=.04772.

CONCLUSIONS

The study succeeded in isolating discrete environmental elements in secondary data and tests their validity not only by demonstrating the expected outcomes of this study, but also confirming assertions of other researchers. For example, the professional norms support and engender productivity, the organizational norms do not. It also lends credence, as demonstrated by the younger respondents perceiving a liberal arts orientation; that there are productive or potentially productive individuals who are seeking professional kudos via the professional norms, yet are not in an environment conducive to it. In fact as demonstrated in the regressions utilizing publication rate as a dependent variable the environments are antithetical to it. It would appear that productivity is not merely the outcome of the academic training, but may result from the ability to recognize and seek environments supportive in either the short- or long-run of professional norms.

The study suggests that Caplow and McGee's observation that the younger academics are professionally motivated and older academics organizationally motivated may be true in general. However, this assertion does not seem to apply to productive scientists. Productive scientists seek professional rewards regardless of career age. This supports Gross and Grambsch's less than facetious assertion that in academia the reward for success is more professional support while the reward for academic failure is promotion

(1968). This condition would be of little concern if indeed, as Crane, Reskin, Long and others suggest institutions make accurate determinations when hiring. However, this might not be verifiable in light of the most intriguing outcome of this study; the high congruence between environmental and teaching goals that is not born out in the parameters for the new position. Scientists at Liberal Arts oriented colleges subscribe to Liberal Arts teaching norms but seek professionally oriented new appointments; Scientists in Research oriented environments subscribe to Research oriented teaching norms but seek organizational rewards in a new position. It would appear that colleges recruit faculty for their teaching orientation; or, there is self selection by prospective and former faculty; or, more likely, faculty adapt teaching goals to suit institutional demands. In reference to research productivity this effect might be of positive value to an individual of modest potential in a research environment; its effect upon similar individuals and talented scientists in a non-research environment is likely to be retrogressive in terms of productivity since it difuses the focus upon research to other activities. The isolation of the environmental elements in this study and consideration of the professional and organizational motivation allowed a more realistic examination of the immediate conditions that affect productivity and non-productivity.

Other assertions that the study allows are:

Congruence of teaching goals and institutional goals does not necessarily mean an appropriate match of faculty member and appointing institution. Despite congruence of these goals in environments where a scientist's productivity is curtailed, there are faculty members who at a personal level do not subscribe to the conditions they work in and seek environments they perceive to be more suitable to research needs. The focus of most studies to date has been upon the individuals of high potential in a research setting; this study confirms the positive effect of a research oriented environment upon not only the superior talent but almost any individuals who work in these conditions. More important it adds credence to the assertion that the institutional environment may have more influence on individuals at non-research oriented institutions; conditions that cannot be overcome by an individual's stamina, the sacred spark or academic training and superior talent.

Productive scientists either have the environmental conditions necessary to productivity or seek out environments that allow greater productivity.

That there are not enough positions of this type available to those who seek them has serious implications for the expansion of knowledge, and the cost effectiveness of educating research scientists who will not have an opportunity to be productive.

The schema developed here should be refined and the study replicated using individual disciplines and used to examine the relationship between the institutional environment, overt response to that environment through expressed teaching goals and underlying personal motivations. The inclusion of the prestige of the doctoral granting institution, not available in this data set would be valuable.

The influence of the relationship between institutional environment, teaching goals and personal motivations may be as important an influence on productivity as academic training.

TABLE II

Expected and Reported Varimax Factor Loadings for Predicted Variable Groups

	Observed Factor Loading on Factor Where Most Predicted Variables Clustered	Observed Magnitude of Loading in Relationship to Other Factors	Predicted Magnitude of Loading in Relationship to Other Factors
1. Liberal Arts/General Education			
Convey Basic Appreciation of Liberal Arts	.64859	1	1
Increase Desire for Self-Directed Learning	.54438	2	2
Develop Creative Capacities	.51340	2	1 or 2
Prepare for More Education	-.16691	4	2
Provide for Students' Emotional Development	.49911	2	1
Achieve Deeper Levels of Student Self-Understanding	.64594	1	1
Provide Tools for Evaluation of Contemporary Society	.69418	1	1
Develop Responsible Citizens	.44974	1	0
2. Research Orientation			
Develop Mastery of Discipline	.58819	1	1
Increase Desire for Self-Directed Learning	.55196	1	1
Develop Ability to Think Clearly	.68746	1	1

	Observed Factor Loading on Factor Where Most Predicted Variables Clustered	Observed Magnitude of Loading in Relationship to Other Factors	Predicted Magnitude of Loading in Relationship to Other Factors
2. Research Orientation, (cont.)			
Develop Creative Capacities	.63744	1	1 or 2
Develop Ability to Pursue Research	.74120	1	1
Prepare for More Education	.67440	1	1
3. Parochial/Other			
Develop Moral Character	.76551	1	1
Develop Religious Beliefs and Convictions	.84445	1	1
Provide for Students' Emotional Development	.59619	1	2
Develop Responsible Citizens	.41830	3	2
Prepare for Family Living	.61005	1	1
4. Service Orientation			
Prepare for Employment	.77364	1	1
Develop Responsible Citizens	.43254	2	1
Provide Local Community with Skilled Human Resources	.78071	1	1

0=Unpredicted variable loading on factor

TABLE III

(Total Sample)

Expected and Observed Relationships (betas) among Professional and Organizational Elements of Appointment, and Perceived Environment

	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
I. PROFESSIONAL CHARACTERISTICS	exp	obs	exp	obs	exp	obs	exp	obs
Personal Teaching Goals								
Master Knowledge of Discipline	-/0		+	.10036	-		+/0	
Increase Desire for Self-Directed Learning	+/0		+		-/0		-/0	
Develop Ability to Think Clearly	+/0	.08344	+	.10932	-/0		-/0	
Develop Creative Capacities	+/0	.06774	+	.16896	-/0	-.06073	-/0	
Develop Ability to Pursue Research	-/0		+	.18006*	-		-	-.08005
Prepare for More Education	+/0		+	.09049	-		-/0	
Qualities of New Appointment								
More Time for Research	-/0		+		-		-	
Smaller Teaching Load	-/0		+	.07300	+/0	-.07094	+/0	
Less Administrative Responsibilities	-/0		+		-		-	
Better Colleagues	-/0	-.15274	+		-		+/0	
Better Research Facilities	-/0	.16187*	+		-		-	
Advancement	+/0		+/0		+/0		+/0	

II. ORGANIZATIONAL CHARACTERISTICS	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
Personal Teaching Goals								
Convey Basic Appreciating of Liberal Arts	+	.11488	-/0		-	.06692	-	-.06876
Provide for Students' Emotional Development	+	.10143	-/0		+	.22053*	-	
Achieve Deeper Levels of Self-Understanding	+		-/0	-.07063	-		-	
Provide Tools for Evaluation of Contemporary Society	+		-/0		-		+	.15377
Develop Moral Character	-/0	-.08471	-/0		+	.22053	-	
Develop Religious Beliefs and Convictions	-/0	-.11973	-/0		+	.20029	-	-.06068
Prepare for Family Living	-/0		-/0		+		-	
Prepare for Employment	-/0		-/0		+/0		+	.17891
Prepare Responsible Citizens	+	.09942	-/0		+		+	
Provide Local Community with Skilled Human Resources	+0	.09353	-/0		-		+	.28326
Qualities of New Appointment								
Higher Salary	+		-		+		+	
Higher Rank	+	-.14424	-		+		+	
Tenure	+		-	.07300	+	-.06476	+	.08097
Less Pressure to Publish	+		-		+		-	
More Opportunities to Teach	+		-		+/0		+/0	
More Administrative Duties	+		-		+		+	.03362
Better Students	+	-.09889	-		+		+	.08782

* Primary Determinant
F to enter greater than 4

LIBERAL ARTS	RESEARCH	PAROCHIAL	SERVICE
R =.35392	R =.43413	R =.48733	R =.46512
R^2=.12526	R^2=.18847	R^2=.23749	R^2=.21633

TABLE IV
(Career Age Less Than or Equal to Ten Years)

Expected and Observed Relationships (betas) Among Professional and Organizational Elements of Appointment and Perceived Environment

	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
I. PROFESSIONAL CHARACTERISTICS								
Personal Teaching Goals								
Master Knowledge of Discipline	+/0		+		-		+/0	
Increase Desire for Self-Directed Learning	+/0		+		-/0		-/0	
Develop Ability to Think Clearly	+/0	.11588	+	.12880	-/0		-/0	
Develop Creative Capacities	+/0		+		-/0		-/0	
Develop Ability to Pursue Research	-/0		+	.26575	-		-	
Prepare for More Education	+/0		+		-		-/0	.09525
Qualities of New Appointment								
More Time for Research	-/0		+		-		0	
Smaller Teaching Load	-/0		+	-.10717	+/0	.05148	+/0	
Less Administrative Responsibilities	-/0		+		-		-	.09133
Better Colleagues	-/0	-.19187*	+		-		+/0	
Better Research Facilities	-/0	.18257	+		-		-	
Advancement	+/0		+/0		+/0		+/0	.04382

	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
II. ORGANIZATIONAL CHARACTERISTICS								
Personal Teaching Goals								
Convey Basic Appreciation of Liberal Arts	+	.09080	-/0		-		-	
Provide for Students' Emotional Development	+		-/0		+	.17871	-	
Achieve Deeper Levels of Self-Understanding	+		-/0		-	.11219	-	
Provide Tools for Evaluation of Contemporary Society	+		-/0		-		+	.11830
Develop Moral Character	-/0		-/0		+	.15079	-	
Develop Religious Beliefs and Convictions	-/0		-/0		+	.17294	-	-.08293
Prepare for Family Living	-/0		-/0		+		-	
Prepare for Employment	-/0		-/0		+		+	.12695
Prepare Responsible Citizens	+	.16945	-/0		+		+	
Provide Local Community with Skilled Human Resources	+/0		-/0		-		+	.30147
Qualities of New Appointment								
Higher Salary	+		-		+		+	
Higher Rank	+	-.12895	-		+		+	
Tenure	+		-	.07989	+	-.13826	+	
Less Pressure to Publish	+		-	.09110	+		+	
More Opportunities to Teach	+		-		+/0		+/0	
More Administrative Duties	+		-	-.10249	+		+	
Better Students	+		-	-.13978	+		+	.09005
* Primary determinant		R^2=.3245		R =.36982		R =.51180		R =.45996
F to enter greater than 4		R^2=.10531		R^2=.13676		R^2=.26194		R^2=.21156

TABLE V

(Career Age More Than Ten Years)

Expected and Observed Relationships (betas) Among Professional and Organizational Elements of Appointment and Perceived Environment

	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
I. PROFESSIONAL CHARACTERISTICS								
Personal Teaching Goals								
Master Knowledge of Discipline	+		+	.16370	-		-	
Increase Desire for Self-Directed Learning	+		+		-		-	-.08213
Develop Ability to Think Clearly	+		+	.12113	-		-	
Develop Creative Capacities	+	.14482	+	.17900	-		-	
Develop Ability to Pursue Research	-		+	.16370	-		-	-.10870
Pepare for More Education	+		+	.10951	-		+	
Qualities of New Appointment								
More Time for Research	-		+		-		-	
Smaller Teaching Load	-		+	-.12481	-	.07215	-	
Less Administrative Responsibilities	-	.09259	+		-		-	
Better Colleagues	-		+		-		-	
Better Research Facilities	-	.14530	+		-		-	
Advancement	+/0		+/0		+/0		+/0	

II. ORGANIZATIONAL CHARACTERISTICS	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
Personal Teaching Goals								
Convey Basic Appreciation of Liberal Arts	+	.11955	+		-		-	
Provide for Students' Emotional Development	+		-		+/9	.18415	-	
Achieve Deeper Levels of Self-Understanding	+		-		-/0		-	
Provide Tools for Evaluation of Contemporary Society	+	.10396	-		-/0	-.1245	+	.19016
Develop Moral Character	+/0		-		+	.23847	0	
Develop Religious Beliefs and Convictions	-/0	-.16850	-		+	.20973	0	
Prepare for Family Living	-/0		-		+		0	
Prepare for Employment	0		-		+	.19437	+	
Prepare Responsible Citizens	+/0		-		+		+	
Provide Local Community with Skilled Human Resources	+/0	.11487	-		0		+	.27985
Qualities of New Appointment								
Higher Salary	+		-/0		+		+	
Higher Rank	+	-.14555	-/0	.08793	+		+	
Tenure	+/0		-/0		+		+	.10795
Less Pressure to Publish	+/0		-/0		+		+	
More Opportunities to teach	+		-					
More Administrative Duties	+		-		+	.04049	+	
Better Students	+	-.14720	-				+	.10776
* Primary Determinant F to enter greater than 4		$R = .39013$ $R^2 = .15270$		$R = .49301$ $R^2 = .24306$		$R = .48328$ $R^2 = .23356$		$R = .47894$ $R^2 = .22938$

TABLE V

(Career Age More Than Ten Years)

Expected and Observed Relationships (betas) Among Professional and Organizational Elements of Appointment and Perceived Environment

	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
I. PROFESSIONAL CHARACTERISTICS								
Personal Teaching Goals								
Master Knowledge of Discipline	+		+	.16370	-		-	
Increase Desire for Self-Directed Learning	+		+		-		-	-.08213
Develop Ability to Think Clearly	+		+	.12113	-		-	
Develop Creative Capacities	+	.14482	+	.17900	-		-	
Develop Ability to Pursue Research	-		+	.16370	-		-	-.10870
Pepare for More Education	+		+	.10951	-		+	
Qualities of New Appointment								
More Time for Research	-		+		-		-	
Smaller Teaching Load	-		+	-.12481	-	.07215	-	
Less Administrative Responsibilities	-	.09259	+		-		-	
Better Colleagues	-		+		-		-	
Better Research Facilities	-	.14530	+		-		-	
Advancement	+/0		+/0		+/0		+/0	

II. ORGANIZATIONAL CHARACTERISTICS	LIBERAL ARTS		RESEARCH		PAROCHIAL		SERVICE	
	exp	obs	exp	obs	exp	obs	exp	obs
Personal Teaching Goals								
Convey Basic Appreciation of Liberal Arts	+	.11955	+		-		-	
Provide for Students' Emotional Development	+		-		+/9	.18415	-	
Achieve Deeper Levels of Self-Understanding	+		-		-/0		-	
Provide Tools for Evaluation of Contemporary Society	+	.10396	-		-/0	-.1245	+	.19016
Develop Moral Character	+/0		-		+	.23847	0	
Develop Religious Beliefs and Convictions	-/0	-.16850	-		+	.20973	0	
Prepare for Family Living	-/0		-		+		0	
Prepare for Employment	0		-		+	.19437	+	
Prepare Responsible Citizens	+/0		-		+		+	
Provide Local Community with Skilled Human Resources	+/0	.11487	-		0		+	.27985
Qualities of New Appointment								
Higher Salary	+		-/0		+		+	
Higher Rank	+	-.14555	-/0	.08793	+		+	
Tenure	+/0		-/0		+		+	.10795
Less Pressure to Publish	+/0		-/0		+		+	
More Opportunities to teach	+		-					
More Administrative Duties	+		-		+	.04049	+	
Better Students	+	-.14720	-				+	.10776
* Primary Determinant F to enter greater than 4		R =.39013 R^2=.15270		R =.49301 R^2=.24306		R =.48328 R^2=.23356		R =.47894 R^2=.22938

TABLE VI

Determinants of Productivity-Publications

	All Respondents		Career Age Less Than or Equal To Ten Years		Career Age More Than Ten Years	
	exp	obs	exp	obs	exp	obs
I. PROFESSIONAL CHARACTERISTICS						
Environment						
Research	+		+		+	.05338
Teaching Goals						
Master Knowledge of Discipline	+		+			
Increase Desire for Self-Directed Learning	+		+			
Develop Ability to Think Clearly	+		+			
Develop Creative Capacities	+		+			
Develop Creative Capacities	+		+			.12020
Develop Ability to Pursue Research	+	.09239	+	.09339		.10300
Prepare for More Education	+		+			
Qualities of New Appointment						
More Time for Research	+					
Smaller Teaching Load	+/0					
Less Administrative Responsibility	+	.07296		.09222		.10211
Better Colleagues	+/0					
Better Research Facilities	+	.05957				
Advancement	+/0					.17278

	All Respondents		Career Age Less Than or Equal To Ten Years		Career Age More Than Ten Years	
	exp	obs	exp	obs	exp	obs
II. ORGANIZATIONAL CHARACTERISTICS						
Environment						
Liberal Arts/General Education	-	-.07641	-	-.11214	-	
Parochial	-	-.05346	-	-.09345	-	-.01806
Service	-		-		-	
Teaching Goals						
Convey Basic Appreciation of the Liberal Arts				-.09752		
Provide for Students' Emotional Development						
Achieve Deeper Levels of Self-Understanding						
Provide Tools for Evaluation of Contemporary Society						
Develop Moral Character		-.11046				
Develop Religious Beliefs and Convictions					-	0.12382
Prepare for Family Living						
Prepare for Employment						
Prepare Responsible Citizens					-	-.10426
Provide Local Community with Skilled Resources						

TABLE VII

Determinants of Grant Getting

	All Respondents		Career Age Less Than or Equal to Ten Years		Career Age Greater than Ten Years	
	exp	obs	exp	obs	exp	obs
I. PROFESSIONAL CHARACTERISTICS						
Environment						
Research	-		-		-	
Teaching Goals						
Master Knowledge of Discipline	-		-		-	
Increase Desire for Self-Directed Learning	-		-		-	
Develop Ability to Think Clearly	-		-		-	
Develop Creative Capacities	-		-		-	
Develop Ability to Pursue Research	-	-.12410*	-		-	-.06635*
Prepare for More Education	-	.08274	-		-	.11134
Qualities of New Appointment						
More Time for Research	-		-		-	
Smaller Teaching Load	-	.12228	-	.19580*	-	.09956
Less Administrative Responsibility	-		-		-	
Better Colleagues	-/0				-	
Better Research Facilities	-	-.011202	0	-.13452	-	
Advancement	-/0					

	All Respondents		Career Age Less Than or Equal to Ten Years		Career Age Greater Than Ten Years	
	exp	obs	exp	obs	exp	obs
II. ORGANIZATIONAL CHARACTERISTICS						
Enviornment						
Liberal Arts/General Education	+		+		+	
Parochial	+		+		+	
Service	+					
Teaching Goals						
Provide for Students' Emotional Development	+		+		+	
Achieve Deeper Levels of Self-Understanding	+		+		+	
Provide Tools for Evaluation of Contemporary Society	+		+		+	
Develop Moral Character	+				+	
Prepare for Family Living	+	.06648	+	.13863	+	
Prepare for Employment	+/0		+		+/0	
Prepare Responsible Citizens	+		+		+	
Provide Local Community wit Skilled Resources	+		+		+	
Qualities of New Appointment						
Higher Salary						
Higher Rank	+	-.09235	+	-.13583	-/0	
Tenure	+/0		-/0		-/0	
Less Pressure to Publish	+	.07423	+		+	.10873

	All Respondents		Career Age Less Than or Equal to Ten Years		Career Age Greater Than Ten Years	
	exp	obs	exp	obs	exp	obs
Qualities of New Appointment, (cont.)						
More Opportunities to Teach	+/0		+		+	
More Administrative Duties	+/0		+		-	
Better Students	+0		+		+	
* Primary Determinant		R =.23080		R =.26124		R =.21845
F= more than 4.0		R^2=.05327		R^2=.06825		R^2=.04772

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